

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the above-referenced application.

Listing of Claims:

Claims 1 – 6 (Cancelled)

7. (Currently amended) An apparatus for forming a silicon oxide film on a substrate by the use of a plasma CVD method, comprising :

a plasma generating region which forms plasma of a first gas containing oxygen atoms;

a deposition region which is placed on the substrate so as to be separated from the plasma generating region;

a grounded barrier disposed between the plasma generating region and the deposition region through which excitation oxygen molecules and excitation oxygen atoms pass into the deposition region from the plasma generating region;

a substrate holding mechanism disposed in the deposition region;

a supply unit which supplies a second gas containing silicon atoms into the deposition region; and

a control unit which controls a pressure of the deposition region and which intentionally controls a first quantity of the excitation oxygen molecules and a second quantity of the excitation oxygen atoms;

wherein said grounded barrier includes at least one opening that connects the plasma generating region to the deposition region, and wherein said at least one opening has a diameter that is less than or equal to the Debye length of the plasma.

8. (Previously presented) An apparatus as claimed in claim 7, wherein:

the control unit comprises a multi-channel optical emission spectrometer which has a thermoelectric cooling CCD and which spectrally detects luminescence of the deposition region.

9. (Original) An apparatus as claimed in claim 8, wherein:

an optical transmitting window is arranged at the chamber wall, which is preferably placed in the deposition region, and

the optical emission spectrometer spectrally measures a light beam passing through the light transmitting window.

10. (Original) An apparatus as claimed in claim 9, wherein:

the deposition region has a luminescent spectrum which is spectrally measured by the optical emission spectrometer,

the excitation oxygen molecule has a first luminescent peak near 761 nm, and the excitation oxygen atom has a second luminescent peak near 777 nm.

11. (Original) An apparatus as claimed in claim 10, wherein:

a deposition condition is controlled such that a relationship between a first area A (O₂) of the first luminescent peak and a second area A (O) of the second luminescent peak near satisfies a relation of $10 * A(O_2) > A(O)$.

12. (Original) An apparatus as claimed in claim 11, wherein:

the deposition condition is controlled by changing pressure of the deposition region.

Claims 13 – 14 (Cancelled)

15. (New) An apparatus for forming a film on a substrate, comprising:

a plasma generating region which forms plasma of a first gas;

a deposition region disposed on the substrate so as to be separated from the plasma generating region;

a grounded barrier disposed between the plasma generating region and the deposition region;

a substrate holding mechanism disposed in the deposition region;

a supply unit which supplies a second gas into the deposition region; and

a control unit which controls a pressure of the deposition region and which controls a first quantity of excitation molecules and a second quantity of excitation atoms;

wherein said grounded barrier includes a hollow portion fluidly connected to said supply unit and further includes at least two openings, wherein a first opening of said at least two openings connects the plasma generating region to the deposition region and a second opening of said at least two openings connects said hollow portion to the deposition region.

16. (New) An apparatus for forming a silicon oxide film on a substrate by the use of a plasma

CVD method, comprising:

a plasma generating region for forming plasma of a first gas containing oxygen atoms;

a deposition region which is placed on the substrate so as to be separated from the plasma generation region;

a grounded barrier disposed between the plasma generating region and the deposition region through which excitation oxygen molecules and excitation oxygen atoms pass into the deposition region from the plasma generating region;

a substrate holding mechanism disposed in the deposition region;

a supply unit for supplying a second gas containing silicon atoms into the deposition region; and

a control unit for controlling a pressure of the deposition region and for intentionally controlling a first quantity of the excitation oxygen molecules and a second quantity of the excitation oxygen atoms.

17. (New) An apparatus for forming a silicon oxide film on a substrate by the use of a plasma

CVD method and having a chamber, comprising:

a plasma generating region which forms plasma of a first gas containing oxygen atoms and which is disposed in the chamber;

a deposition region which is placed on the substrate so as to be separated from the plasma generation region and which is disposed in the chamber;

a grounded barrier disposed between the plasma generating region and the deposition region through which excitation oxygen molecules and excitation oxygen atoms pass into the deposition region from the plasma generating region;

a substrate holding mechanism disposed in the deposition region;

a supply unit which supplies a second gas containing silicon atoms into the deposition region; and

a control unit which controls a pressure of the deposition region and which intentionally controls a first quantity of the excitation oxygen molecules and a second quantity of the excitation oxygen atoms;

wherein the grounded barrier contacts with a periphery of the chamber.